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ABSTRACT

This guide to residential state academies for academically gifted high school students discusses the history of this movement, student characteristics, curricula, faculty, outreach programs, and evaluation. The establishment of the nine existing state institutions is traced from the prototype, the North Carolina School for Science and Mathematics, to the most recent, established in Alabama in 1991. Reasons for such schools are given, ranging from the specialized curricula needed by such students to their need for peer support. The question of elitism is addressed, suggesting that such schools actually are egalitarian in that they provide an opportunity for all students from both poor and wealthy regions of the state to go as far as they can. The various selection processes are described and compared, noting that the use of holistic methods (rather than standardized tests) results in enrollments more consistent with the demographic profiles of the state's population. Curricula are discussed, with special focus on the Indiana Academy Curriculum. Criteria for selecting faculty are then briefly considered as are state academy outreach programs. The lack of comprehensive and systematic evaluation of these new institutions is noted. (Contains 21 references.) (DB)

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State Academies for the Academically Gifted

James E. Green

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State Academies for the Academically Gifted

by
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Introduction

The education reform movement of the 1980s spawned numerous commission reports, partnerships between schools and business, state laws, and innovative school programs. Sometimes the proposals for reform were hopelessly superficial. Other times they revealed the sublime genius of the American people in times of crisis. And they often have been controversial.

One initiative that is attracting increasing attention is the state-supported residential academy for academically gifted high school students. Nine states now have such academies, and more are in various stages of planning in other states. In these specialized secondary schools, academically gifted students live and study in settings where standards are geared toward the highest common denominator – excellence. The academic life is rigorous and challenging; and the residential life is supportive, giving students the opportunity to live and grow in an atmosphere where their unique talents are understood and encouraged.

Since the establishment of the first state academy for the academically gifted in North Carolina in 1980, educators have observed the movement with caution. Some fear that these schools will promote an elite corps of intellectuals, heaping more educational privileges on an already privileged class. Others claim the schools are simply too costly, and they divert needed funds from other very worthy educational programs. Yet another concern is that the residential schools

contradict the emphasis we should be placing on family and school relationships, that adolescents should grow up in their homes under the care and supervision of their own parents.

Advocates of statewide, state-supported, residential schools for the academically gifted point to a substantial body of research supporting the accelerated study of advanced subjects, ability grouping, and cooperative learning among gifted high school students (Feldhusen 1989). In addition, proponents cite the schools themselves as evidence that the plan is working – many more gifted high school students than before are realizing their full potential.

As with any significant development in public education, discussion has not always been guided by fact and reason. Productive dialogue requires that educators be informed about state academies for the gifted. This fastback addresses several recurring questions in this discussion. Where did state academies begin? Why are they needed? Do state academies promote elitism? What is the mission of a state academy? What are the students and the faculties like? What is a typical curriculum? What is residential life like? How do state academies reach out to other schools? And, how do we begin to evaluate state academies?

How Did State Academies Begin?

In the United States, publicly supported specialized schools for gifted high school students, such as the Bronx School for Science, have existed for more than a half-century (NCSSSMST 1991). But the prototype for the current movement of statewide, state-supported, residential schools for academically gifted high school students is the North Carolina School for Science and Mathematics, which was established by the North Carolina legislature in 1978 and first enrolled students in 1980 (Eilber 1987).

The North Carolina School started with makeshift facilities in a vacant hospital in Durham. Under the direction of Charles Eilber, the founding director, the school succeeded in turning the old hospital buildings into a modern boarding-school campus by the end of its first decade. The school operates as an affiliate member of the University of North Carolina system, rather than being regulated by the North Carolina Board of Education. Consequently, it has a considerable degree of flexibility in designing its policies and programs.

Eight similar state institutions followed within 10 years. Louisiana was planning its own state academy at the same time North Carolina's was beginning (NCSSSMST 1991). Established by the Louisiana legislature in 1980, the Louisiana School for Math, Science, and the Arts began in a vacant public school building adjacent to the campus of Northwestern State University in Natchitoches. Although the Louisiana school operates autonomously from the university, the school's

programs are enriched by the many resources the university offers. The founding director of the Louisiana school, Bobby Alost, envisioned this relationship between the school and the local university as central to its success.

The Illinois Mathematics and Science Academy (IMSA), located in Aurora, was founded in 1985 by the Illinois General Assembly and opened its doors to students in 1986. Governed by its own board of trustees, IMSA submits its budget requests through the Illinois Board of Higher Education. The inspiration for IMSA came from Leon M. Lederman, then the director of the Fermi National Accelerator Laboratory in nearby Batavia, Illinois. With Stephanie Pace Marshall as its founding director, IMSA began in a vacant high school building and continues to operate on the same campus, which has been expanded and modernized to accommodate the special needs of the curriculum and residential programs. Whereas all the other state academies for the gifted are for students in grades 11 and 12, IMSA enrolls students in grades 10 through 12 (IMSA 1992).

In 1988 three additional state academies were established: the South Carolina Governor's School for Science and Mathematics, on the campus of Coker College in Hartsville; the Mississippi School for Science and Mathematics, on the campus of Mississippi University for Women in Columbus; and the Texas Academy for Mathematics and Science, at the University of North Texas in Denton. The schools in South Carolina and Mississippi are autonomous institutions located on college campuses, much like the Louisiana school.

The Texas Academy for Mathematics and Science (TAMS) is unique. It was designed as a special, early admissions program of the University of North Texas. The founding director of TAMS, Roger Redding, was a physics professor at the University of North Texas; and the entire teaching staff at TAMS are university faculty. Students enroll exclusively in university courses for college credit.

In 1990 two more state academies were founded: the Oklahoma School of Science and Mathematics in Oklahoma City, and the Indi-

ana Academy for Science, Mathematics, and Humanities, located at Ball State University in Muncie.

Chartered by the Oklahoma legislature in 1983, the Oklahoma school began operations in 1990 with Edna McDuffie Manning as its first president. Many features of the school resemble those in the North Carolina and Illinois schools. Although autonomous and with its own campus, the school is in league with nearby government, research, and higher education centers for many of its programs.

The Indiana academy adds yet another twist to the concept of statewide, state-supported residential schools for gifted high school students. Indiana's academy is affiliated with a K-12 laboratory school operated by one of the nation's leading colleges of education, Teachers College at Ball State University. While the Indiana academy has its own curriculum and faculty, its location on a university campus and its organizational relationship with Ball State University provide many facilities and educational opportunities that otherwise would not be possible. In addition, its relationship with the university's laboratory school underscores the emphasis it gives to outreach to Indiana's public schools.

The Alabama School of Mathematics and Science, located in Mobile, opened in 1991 as a partnership between public education and the private sector. The state legislature provides operating funds, but all capital outlay comes from private sources. The school has its own campus but collaborates with neighboring institutions. For example, the school has a special agreement with the University of South Alabama so that students can use that university's library.

Each of these state academies serves students who demonstrate the ability and motivation to profit from a rigorous academic curriculum, beyond what is typically offered in traditional secondary education. Although the term "gifted and talented" does not appear in the mission statements of most of these academies, the targeted population is clearly evident – students who have demonstrated high academic ability and achievement.

The mission statements of all the academies make specific reference to science and mathematics. The Indiana academy also gives equal emphasis to the humanities, and Louisiana gives equal emphasis to the arts. The mission statements also convey, at least implicitly, a sense that the development of the state's talented youth is an urgent matter for both the state and the nation, and that global economic competition demands the development of these human resources.

These state academies also have significant responsibilities to other public schools in their states. Some of the academies were founded with outreach to public schools as a principal purpose. Among the academies that give formal attention to outreach responsibilities are Illinois, Indiana, Louisiana, Mississippi, North Carolina, Oklahoma, and South Carolina. The Indiana academy's enabling legislation and mission statement stress service to the state's public schools and even specify that telecommunications technology will be used to make the academy's curriculum available to students throughout the state.

Why Have State Academies for the Gifted?

Nowhere is the need for improvement in secondary education more critical than in science and mathematics, especially in programs for gifted students. According to the 1983 report of the National Commission on Excellence in Education, *A Nation at Risk*, more than half of all gifted students do not reach their academic potential with respect to achievement in school. When compared with students in other industrialized nations, American students ranked last in seven different categories. College Board achievement tests recorded declines in physics and English scores, and the number of students showing superior achievement on the SATs also declined. Further, the report cited studies that today's American students are increasingly illiterate in science and technology.

Pupils will not learn what they do not have the opportunity to learn. Too many of America's most promising students attend schools where advanced courses, especially in science and mathematics, are not available. For example, at the time the Oklahoma School of Science and Mathematics was founded, barely half of that state's high schools offered physics or trigonometry (Oklahoma School for Science and Mathematics 1992*a*). Similar curriculum deprivation exists in other states. State academies for the academically gifted offer the means to equalize educational opportunities so that promising students are not deprived because of where they live or because their parents can not afford a private education.

State academies have several advantages over trying to establish special programs in every school. First, a central site offering specialized programs is much more economical than attempting to make the same programs available in numerous sites around a state. In Oklahoma, for example, more than three-fourths of the school systems enroll fewer than 500 students (Oklahoma School for Science and Mathematics 1992*b*). In such schools the possibility of offering such courses as Advanced Placement physics, chemistry, or calculus is remote.

State academies also can become centers for developing and disseminating educational programs for other academically gifted students and their teachers. Outreach programs offer students and teachers in local high schools many programs similar to the ones found at a state academy. Most of the state academies offer summer institutes for both students and teachers, and several are using interactive telecommunications to offer their special courses to pupils in local schools in their states.

Academically gifted students require a very different curriculum from that offered at most high schools. Subject matter should be accelerated and taught at advanced levels. This requires faculty who are more experienced and more highly trained in their academic disciplines. Moreover, gifted students usually have multiple interests and are intensely involved in areas that fascinate them. Therefore, the curriculum must have both breadth and depth if it is to serve gifted students. State academies for the gifted, especially those that can draw on the resources of leading universities or research facilities, can garner the resources necessary for such an extensive curriculum.

Gifted adolescents also require a supportive peer group – one that understands and appreciates what it is like to grow up gifted. In the nation's best or largest schools, gifted students might have the opportunity to socialize with like-minded peers; however, those peer groups often suffer the ridicule of the rest of the school community (and, regrettably, some teachers). In the very brief history of state acade-

mies for the gifted, one of the most noticeable outcomes has been the social maturation of the students.

One of the arguments against state academies centers on the popular idea that grouping gifted students is detrimental both to gifted students and to the rest of the school population. However, a preponderance of research strongly supports grouping gifted students so that an appropriate curriculum can be provided (Feldhusen 1989; Slavin 1990). Moreover, there is no evidence to support the claim that the regular curriculum is adversely affected when gifted pupils are grouped, or that attitudes of students – gifted or not – are affected negatively.

Perhaps the best argument for state academies for the academically gifted can be found in a statement by Nathan Glazer of Harvard University: "The development of excellence requires the company and competition of the excellent, in whatever area we are striving for excellence" (1987, p. 197). What we readily accept as an axiom for the development of athletes or performing artists also holds true for the development of scholars. Academically gifted students are more likely to thrive in a school community where high achievement is valued and creativity is common. The community of young scholars that is the quintessence of a state academy creates a critical mass of energy that cannot be found in any other type of secondary school.

Are State Academies for Just the Elite?

Some politicians and educators have criticized state academies for the academically gifted as elitist. Often, this concern comes from the aversion middle-class Americans have to deliberately giving additional advantages to people who already are advantaged. (The obvious exception in schools, of course, is athletics.) We believe that the public schools are the great equalizing agent in society; and some fear that when we create special schools, we then establish a privileged social class of the intellectually elite. This argument against state academies is founded on the belief that public education should provide equality of educational opportunity.

Thoughtful examination suggests that equal opportunity in public education means that every child should have the same chance to reach her or his full potential. Gifted children from poor families deserve the same opportunities as children from wealthy families; and gifted children from small, rural schools or inadequately funded inner-city schools deserve the same opportunities as children from amply funded suburban schools. But children from poor families, isolated rural communities, and financially starved urban schools do not have the same educational opportunities as children from wealthy families or large suburban schools. State academies for the academically gifted exist so that opportunities can be available to students who otherwise would not have them.

Advocates of state academies for the gifted claim that they are, in the purest sense, egalitarian, rather than elitist. Their purpose is to provide an education that enables students to go as far as they can, limited only by their ability and their motivation, not their circumstances. In literature describing the Oklahoma School for Science and Mathematics (1992*c*), a brief statement by Thomas Jefferson is quoted: "Let us in education dream of an aristocracy of achievement rising out of democracy of opportunity." That idea captures the egalitarian mission of state academies.

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Student Characteristics and Selection

Admission to state academies for the academically gifted is highly competitive. Most schools have three or four applications for every available spot. All the schools have formal admissions programs and prescribed methods for reviewing applications. Since enrollment capacities at the academies vary – ranging from about 135 to 650 – the size of a typical entering class also varies.

In each of the nine states that have state-supported academies, the enabling legislation specifies that the schools focus on students who are academically talented. Each academy informs high schools in the state about academic and residential expectations and provides an academic profile of the students who already attend. The academies' recruiting strategies discourage generating mass application pools that would result in large numbers of applicants being denied admission. The academies have found that concentrating recruiting efforts on students who have a reasonable chance of being accepted allows for a more thorough review process and more individual attention in the pre-admission counseling stage.

For a student interested in attending a state academy, the process usually begins in the fall semester of the sophomore year for admission as a junior. (Illinois is the exception, offering grades 10 through 12). All the academies require some kind of national standardized aptitude test, the most common being the SAT. Some academies use the PSAT or the ACT. In all cases, the tests used by academies are

"off-level," that is, they are using tests designed for a student population that is older and has more formal schooling. Tests are taken in the 10th grade for admission as 11th-graders or, in the case of Illinois, in the ninth grade for admission as 10th-graders. This makes the tests more useful for identifying academic precocity among students. Most state academies do not establish minimum cut-off scores, even though Julian Stanley (1987), a leading expert in the identification of the gifted, recommends doing so. All require official verification of high school grades and, in some cases, junior high or middle school grades.

Many of the academies incorporate review procedures that address multiple intelligences and the importance of family, school, and community environment in nurturing talent. In addition, since the state academies are residential, they seek students who have the self-discipline and maturity to succeed in a rigorous academic program while living away from home. For example, North Carolina uses several stages, including interviews, in its applicant review process. Illinois, Louisiana, and Indiana all have carefully constructed file-review procedures that holistically evaluate and rate the special accomplishments and awards of applicants, which might reveal talent not reflected in test scores or school grades. Nearly all of the academies require recommendations, and most require that the recommendations be submitted on special forms that ask for specific information. Some academies seek anecdotal information that is believed to characterize students with very high academic ability, self-discipline, and motivation.

The student enrollment profiles at state academies are understandably unique among the nation's public secondary schools. In those academies that use the SAT, students' composite scores average approximately 1200. Academies using the PSAT or ACT experience similarly high averages.

Graduates of state academies also make a striking profile. A typical graduating class will have an abundance of academic honorees.

Each state academy can cite examples of the individual awards students receive in national competitions, such as the Westinghouse science competition. Students also stand out in national testing programs. For example, Indiana had approximately 20% and Oklahoma had approximately 30% of students in their first graduating classes named as National Merit finalists or semifinalists (Green 1992; Oklahoma School of Science and Mathematics 1992*b*). In its 1991 graduating class, Illinois had 62 National Merit semifinalists (37%) and 30 National Merit scholars (18%) (IMSA 1991).

Although none of the state academies gears its curriculum exclusively to Advanced Placement courses, most of them encourage students to take examinations for advanced placement credit. The level of student achievement in advanced subjects at state academies is clear from the results of the various AP examinations, especially since about half the students take at least one AP test. In 1991, Illinois had a 92% pass rate (an AP score of 3 or higher), Mississippi had an 89% pass rate, and South Carolina had a 60% pass rate (IMSA 1991; Mississippi School for Mathematics and Science 1992; South Carolina Governor's School for Science and Mathematics 1992).

The demographic profiles of the state academies vary from state to state. When the state academies were proposed in their respective states, skeptics expressed fears that such specialized schools would inevitably be comprised predominantly of students who are male, Caucasian, and affluent. However, most academies have diverse student enrollments.

State academies are accountable to their legislatures for achieving both equity and equality. Most aggressively target underrepresented populations and geographic regions in their recruiting efforts; and some, such as Illinois, have special programs for recruiting students from underrepresented groups. However, none has resorted to basing admissions decisions on race or gender quotas.

Typically, those academies that base student selection heavily on standardized test scores will have a disproportionate ratio of males

to females and Caucasians to African-Americans and Hispanics. Those academies that use more holistic methods for selecting students – for example, North Carolina and Indiana – have student enrollments that are more consistent with the demographic profiles of their states. In all the academies, African-Americans and Hispanics continue to be underrepresented.

The Illinois academy reported the ethnic distribution for its 1993 graduating class as 61% Caucasian, 28% Asian-American, 5% African-American, 4% Hispanic, and 2% other (IMSA 1991). The South Carolina academy reported 1991-92 enrollment as 80% Caucasian, 10% African-American, and 10% Asian-American (South Carolina Governor's School for Science and Mathematics 1992). The Indiana academy reported a 1991-92 enrollment of 79.19% Caucasian, 5.37% African-American, 4.36% Asian-American, 3.36% Hispanic, 3.02% other, and 4.70% not reported (Green 1992).

Comparisons between states are not instructive, because the demographic characteristics of the states themselves vary widely. Progress toward achieving equity can be understood only when a given academy's profile is compared to the demographic profile in its own state. In Indiana's case, the demographic profile of the state academy comes close to the state's profile, demonstrating that simultaneously achieving equality, equity, and excellence is an attainable goal for all state academies for the academically gifted.

Because state academies are funded by their state legislatures, it is politically important for an academy's enrollment to represent as many geographic regions in the state as possible. Some of the academies have been more successful than others in making their enrollments representative of their states. In its 1990-91 annual report, the Illinois academy reported that more than half its student body was from the Chicago and suburban Chicago area. By contrast, Indiana's first class of 158 students represented 63 of the state's 92 counties and 127 high schools (Green 1992).

The specific methods a state academy uses to select students influence the outcome. In Indiana, geographic diversity was emphasized in the design of its student selection procedures. When the Indiana academy began, it divided the state into 15 admissions zones with 10th-grade populations of approximately equal size. Students were invited according to their standing in their respective geographic zones. In the first two years of the Indiana academy, 160 students were invited. The first 105 were drawn from the 15 zones, seven from each zone. The final 55 students came from "at large." By inviting the at-large applicants after the applicants from the geographic zones had been identified, the possibility was minimized that an invited student from a zone might rank lower than a student not invited. This method also optimized geographic distribution across the state (Green 1992).

Test scores and demographic statistics do not begin to describe the students at state academies. Apart from their exceptional academic abilities and interests, the students are much the same as students in other schools. They enjoy participating in the same extracurricular activities, listening to the same music, playing the same video games, going to the same movies, wearing the same style clothing, and dating. As a consequence, all the state academies give high priority to supporting extracurricular activities in their school programs and strive to make the residential life at the academies well balanced.

Curricula at State Academies

Extraordinary students call for an extraordinary curriculum. While state academies offer courses that are more comparable to college courses than to those in high school, they are not merely college courses delivered two years earlier than normal. Many special features are added to accommodate the characteristics of gifted adolescents.

Research has revealed three characteristics that distinguish gifted from normal students. Gifted students are capable of learning at faster rates; they are more capable of finding, solving, and acting on problems; and they are more capable of abstract thought. Experts on curriculum for the gifted promote a differentiated curriculum that accommodates all of these characteristics by integrating accelerated study of advanced subjects, enrichment activities, and experiences that extend learning beyond the confines of the school (VanTassel-Baska 1988*a*).

State academies for the academically gifted try to achieve a differentiated curriculum in many ways. Academies located on or near university campuses use undergraduate courses to complement their core offerings. At the Texas Academy for Mathematics and Science, which is an early admissions program, the entire curriculum comes from the University of North Texas.

Most academies offer courses that conform to the College Board's Advanced Placement (AP) program. One of the pioneers in the state

academy movement, Julian Stanley (1987), exhorts schools of this kind to offer courses designed expressly to prepare students to pass AP exams in biology, calculus, chemistry, computer science, and physics.

Although the state academies, with the notable exceptions of Indiana and Louisiana, are named for their focus on mathematics and science, they do not exclude the study of humanities and the arts. Most could more appropriately be called "academies for the liberal arts and sciences." In addition, interdisciplinary courses that connect concepts from mathematics and science with the humanities are common.

Many aspects of the curricula in state academies include innovations designed expressly for gifted adolescents. Apprenticeships with researchers in universities or research laboratories are common, as are opportunities for independent study. The Illinois academy has a unique academic schedule that features Exploration Days, in which students participate in independent and group research projects, special seminars and symposia, and academic field trips. The Indiana academy instituted a scheduling innovation that it calls "May Term." The last two weeks of the school year are reserved for intensive minicourses taught by academy faculty and visiting professors.

The Indiana Academy Curriculum

The curriculum of the Indiana Academy for Science, Mathematics, and Humanities illustrates how the advanced level of study in the liberal arts and sciences is integrated with many special programs.

The curriculum of the Indiana academy is tied to the legislation that established the school, which stipulates that the academy must serve a residential student body of high school juniors and seniors who are distinguished for their intellectual ability. Moreover, the legislature included the words "science, mathematics, and humanities" when it named the academy.

Two basic assumptions in planning the curriculum were that the curriculum should benefit academically gifted adolescents, and it

would encompass a wide domain of knowledge. Because the curriculum would need to integrate acceleration, enrichment, and extended learning experiences, the Indiana academy created a multidimensional curriculum design.

A Multidimensional Approach to Curriculum

One of the leading experts on curriculum for the gifted, Joyce VanTassel-Baska (1988*a*), has outlined three basic curriculum models for the gifted and talented: the content mastery model, the process/product research model, and the epistemological concept model. The content mastery model places greater importance on the acquisition of knowledge. Hence, accelerated study of advanced subject matter is emphasized. The process/product research model is built around investigation, and it underscores the importance of independent learning through individual or collaborative student products. The epistemological model takes a constructivist approach, emphasizing the discovery of conceptual learning through the integration of subject matter. All three approaches are used in the curriculum of the Indiana academy.

The Indiana academy's curriculum includes a Core Curriculum, an Exploratory Curriculum, and an Extended Curriculum. These three dimensions are synchronized to assimilate accelerated and advanced study of the formal disciplines, exploration through critical thinking and problem solving, and formation of the whole person.

The Core Curriculum. The academy requires a basic core of studies that encompasses the traditional liberal arts and sciences. All students take courses from prescribed sets in English literature, foreign language, history, government, science, mathematics, and computer technology. Core courses include many of the College Board's Advanced Placement courses in science and mathematics, as well as interdisciplinary courses in the humanities.

Students must be enrolled in a science course each semester. To graduate, they must have earned a full year's credit each in biology,

chemistry, and physics. However, most graduates have completed four or more years' credit.

When the Indiana academy devised its science program, the planners recognized that nearly all its incoming juniors already would have completed biology and chemistry in their regular high schools. Consequently, physics was designated as the core science course for juniors. Because not all students would be gifted in science, the introductory physics program was given a multi-level design, with the highest level being the AP Physics course.

The academy offers a wide variety of sciences for students in their senior year. Course offerings include chemistry (from a standard high school course through AP chemistry), organic chemistry, and biochemistry. In addition, astronomy, astrophysics, physics, human genetics, molecular biology, comparative anatomy, and microbiology are offered. All science courses are taught with a two-hour laboratory each week to emphasize experimentation.

According to Joyce VanTassel-Baska (1988*b*), the essential ingredients of a science curriculum for gifted students include an emphasis on independent laboratory work and research, both library based and experimental; mastery of content in science within the framework of the scientific method; and meaningful interaction with professional scientists. The Indiana academy science program attempts to incorporate all these features.

Students at the Indiana academy must earn four years' credit in mathematics, with at least one year in a level above second-year algebra and plane geometry. They must be enrolled in a mathematics course each semester at the academy. Mathematics courses begin with a traditional second-year high school algebra course and continue through multivariate calculus. Probability, statistics, and discrete mathematics courses are also offered.

Though it is a goal of the academy for every student to complete a course in calculus, the academy recognizes that not all students will be gifted in mathematics. Therefore, the mathematics program has

several levels. For example, the core mathematics course for juniors, "Elementary Analysis," is offered at three levels of abstraction. The first takes an intuitive approach and uses the new graphing calculator technology. The highest level is more theoretical.

Students learn to use the computer as a tool in all their subjects at the Indiana academy, because the faculty integrates computers throughout the curriculum. All students must complete a proficiency requirement by the end of the junior year. The academy's computer network interfaces with Ball State University's computer facilities, and the proficiency requirement ensures that the system will be fully utilized by students in their course projects.

At the Indiana academy, the study of humanities is not merely appended to the study of science and mathematics; the humanities are regarded as the conscience and purpose of science and mathematics. Core courses in English language and literature, history, government, and foreign language are required of all students. All courses, including science and mathematics, require extensive reflective reading and formal writing that stress critical thinking skills. In addition, students enroll in a series of colloquia that focus on interdisciplinary ideas.

Foreign language requirements may be completed by studying any of eight different languages, including Chinese, Japanese, Russian, and classical languages. Graduation requirements specify three years in one language or two years each in two languages.

Juniors must enroll in a pair of courses: "The English Language and the American Literary Experience" and "The American Experiment." This core of American literature and history ensures that students master the subject matter of their national heritage. Even though these courses are not designed as AP courses, many students choose to take the AP exams in English and U.S. History.

In their senior year all students enroll in a one-year course that integrates the study of world civilization, geography, and economics with study of international and American national, state, and local government. In English, seniors take either a one-semester course in British

literature or a one-semester course in world literature. They also must complete one additional course in literature, writing, or linguistics. Numerous elective courses are offered in philosophy, social science, and journalism.

The academy's Colloquia Series was inspired by the "Great Ideas" programs found in many institutions, but its actual form is unique. The program consists of formal lectures, readings from classical and contemporary authors, and small-group discussions. Separate colloquia are offered for junior and senior classes, but each class has a common set of readings for their discussions and lectures. For example, the academy's first colloquium was "The Nature of Evidence." It focused on the study of Descartes' *Discourse on Method* and his premise, *cogito ergo sum*.

The Exploratory Curriculum. The Exploratory Curriculum has four elements: a research seminar, an apprenticeship program, advanced courses from Ball State University, and electives from the academy's own advanced courses. The research seminar emphasizes the development of research skills and the completion of a research project. The apprenticeship program teams academy students with researchers or other professionals for either four or eight hours per week. The university course option lets students enroll in university courses without cost. The students receive high school credit for these courses, but they can pay tuition to the university and receive college credit.

The academy also offers numerous elective courses, including computer technology, advanced topics in mathematics and literature, and specialized courses in science or philosophy. These courses are taught by academy faculty and by professors from Ball State University. Most juniors enroll in one or two elective courses each semester, and seniors usually enroll in three.

The Extended Curriculum. This aspect of the curriculum meets the academy's goal of educating the whole person, not just the intellect. It includes community service and wellness programs, as well as opportunities to attend and participate in cultural events, social activi-

ties, and athletics. In addition, residential life at the academy is regarded as a vital extension of the curriculum. As a consequence, the Extended Curriculum is supervised by the Assistant Director for Residential Life and is implemented largely by the residence counselors.

Gifted students are potential leaders; but leadership is not inherent in giftedness (Foster and Silverman 1988). Therefore, special programs are included in the curriculum so that potential leadership might be transformed into responsible, ethical action.

Students are required to serve their community and their academy through structured service programs. Many opportunities for community service exist in the community surrounding the academy. For example, some students helped construct a house in the area for Habitat for Humanity. However, many students choose to perform their service in their home communities between their junior and senior years. In fact, the Indiana academy encourages students to look to their own communities for service opportunities.

Most state academies also require students to perform work for their school. Cleaning chores, grounds maintenance, and clerical tasks are included in a system for sharing responsibilities. At the Indiana academy, each student is scheduled to work approximately three hours per week.

The wellness program embraces physical, intellectual, social, and emotional wellness. Students work with their residence counselors in planning and participating in special programs on health maintenance as well as fitness activities. Each student creates a personal wellness plan after a wellness screening is completed by Ball State University's Institute for Wellness.

The Indiana academy's Extended Curriculum also includes many of the same activities considered "extracurricular" at traditional schools. Examples include interscholastic and intramural athletics, music, drama, academic teams, clubs, and dances. The Indiana academy is affiliated with Burris Laboratory School for extracurricular ac-

tivities, so the same scope of activities found at a typical, small high school is available. Students in the Indiana academy and Burris Laboratory School are integrated for all interscholastic athletic, music, and drama activities; and most of the social activities mix student groups from both the Indiana academy and Burris.

Students at the Indiana academy also enjoy the cultural life of Ball State University. Students may attend the lectures, plays, concerts, or cultural exhibitions that university students attend. Often, these cultural events are incorporated into class activities.

Residential Life. Students at the Indiana academy reside in a self-contained residence hall complex located on the Ball State University campus. The residence hall complex is next to Burris Laboratory School, where many of the classes are held. Because the living experience is vital to the learning experience, all students, even those who live within commuting distance, must reside in the hall.

The rules and regulations of residential life are designed for a coeducational, adolescent community. As a result, the lifestyle is like a secondary boarding school instead of a college. Full-time residence counselors, one for every 20 students, live in the hall and supervise the students. The residence counselors all have college degrees and are chosen for their previous experience in residential life or youth-related work. However, the "RC's" are more than supervisors. They also are responsible for conducting student-development programs and fostering a community where cooperative learning can thrive.

The residential nature of the Indiana academy gives the curriculum much of its energy. In a residential community for gifted learners, students learn to cooperate. Cooperative learning – planned as well as casual – often is a new experience for gifted students, many of whom worked independently and often in isolation in their home schools. Residential life facilitates group projects, peer tutoring, and group study sessions.

The Faculty of State Academies

A profile of the faculty of any state academy will be as uncommon as that of its students. Instructors come from colleges and universities, business and industry, and public and private secondary schools. None of the nine state academies requires that instructors hold teaching licenses or certificates from their respective states.

One explicit, transcending criterion for choosing faculty is that they must have mastered the discipline they are expected to teach. Accelerated courses and the spontaneity necessary in classes for gifted pupils demand the highest order of expertise in a subject. As a result, most of the academies boast of faculties that resemble those in colleges or universities. With very few exceptions, instructors hold at least a master's degrees in their subject areas; and a third to half hold doctorates.

A second criterion is previous teaching experience. While some of the academies have successfully employed professionals from business and industry as teachers – engineers and lawyers, for example – most require previous teaching experience, preferably with high-ability students. As a rule, instructors have established very successful records in teaching, either at the high school or undergraduate collegiate level, before taking posts in academies. As yet, none of the existing state academies requires that its instructors have formal training in the education of the gifted prior to employment.

Some academies have instituted special programs to include scientists, engineers, university professors, and other professional practitioners in their academic programs. Both the Illinois and Indiana academies have visiting professor programs. In the Indiana academy, a few select teachers from that state's public schools are invited to join the faculty for a year as part of its Outstanding Educator Fellowship Program.

Salaries for faculty in state academies often are less than salaries in public secondary schools for faculty with equivalent qualifications; rarely are salaries higher. Currently, none of the state academies has a tenure system, though some do use multi-year contracts to provide the job security necessary to retain faculty.

State Academy Outreach Programs

With few exceptions, state academies for the gifted include outreach to public secondary schools as a vital element in their missions. Most provide summer programs for students or teachers from schools in their state. Several, like Louisiana, Illinois, and Indiana, use interactive telecommunications to offer courses to students in other schools. The Illinois academy plays a major leadership role in developing and disseminating innovative programs throughout Illinois and across the nation. While other state academies have similar outreach programs, those at Illinois are illustrative of how state academies for the gifted reach out to other schools.

Following are some of the outreach programs sponsored by the Illinois academy: IMPACT II Teacher-to-Teacher Network to Enhance Mathematics and Science Education in Illinois brings together creative teachers to share their ideas. The IMSA Leadership Conference and the Regional Working Conferences are annual, statewide conferences for school leaders that focus on significant state and national reports and policy studies as a basis for changing mathematics and science education. Project A.S.S.I.S.T. is a series of workshops on superconductivity for teachers of middle school science and high school chemistry, physics, and computer science. The Summer 'AD' Ventures in Mathematics, Science, and Technology are summer residential programs for Illinois students in grades 7 to 10. In addition, throughout the year, the Illinois academy offers IMSA Chal-

lenge programs in sites around the state for minority students in grades 7 to 9.

The Illinois academy also sponsors District Leadership Teams comprised of school leaders from 30 Illinois school districts, who work with Illinois academy personnel on mathematics and science curriculum projects.

Outreach Through Telecommunications

The Indiana academy uses sophisticated telecommunications technologies to deliver outreach services to gifted students in public schools throughout the state. During 1992-93 school year, the academy used Ball State University's telecommunications facilities and the Indiana Higher Education Telecommunications System (IHETS) to deliver seven advanced high school courses to 23 Indiana high schools. More than 250 students in remote sites around the state were enrolled in such specialized courses as AP Physics, AP Calculus, Survey of Cell and Molecular Biology, Human Genetics, Chinese, and Russian.

The system uses live television with highly sophisticated computer graphics and two-way interactive audio communication. The instructor of an IHETS class teaches the live class of academy students, with students in the remote sites participating through the interactive telecommunications system. A student hundreds of miles away can interrupt the instructor and ask a question just as any student can in the live class.

The benefits of using telecommunications in outreach programs are obvious. A small school can offer advanced or highly specialized courses to students who are ready to take them, even though the school, by itself, would not likely have the enrollment or faculty expertise to offer the course. Moreover, the class is conducted in a live setting, complete with all the usual classroom dynamics. The schools using the Indiana academy's televised courses are able to begin the program with a relatively small investment.

Evaluation of Academies for the Gifted

Do state-supported academies for the academically gifted actually make a difference? And how do these differences, if there are any, fit the expectations of the diverse groups who are involved?

Each state with a publicly supported academy for the gifted has made a multi-million dollar investment. And investments of this size demand accountability. However, the paucity of literature on the subject is surprising. There is very little literature even on the need to evaluate state academies.

One reason for the failure to produce comprehensive and systematic evaluation of state academies is that the schools simply have not had time. State academies are only a decade old. During the first years of any new institution, too many aspects of the program are changing and there is little chance to design a comprehensive evaluation.

A more important reason for the lack of a comprehensive evaluation of state academies is that measurement problems abound when evaluating programs for the academically gifted. Extraordinary students and rarified programs do not fit typical paradigms for evaluating educational programs. These students already score in the highest few percentiles on norm-referenced tests when they enter the programs. Given the errors of measurement on most of the tests used, there is little or no room for demonstrating improvement. Moreover, the program goals aspire to higher skill levels and greater knowledge than measured by traditional evaluations. As a result, evaluators are

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forced to abandon objective instruments and use qualitative methods. It is much more difficult to establish the reliability of qualitative research because the preponderance of evidence that is required must evolve over years of experience.

Clearly, both objective and subjective data will be needed for comprehensive evaluation. Given the multiple talents represented in gifted adolescents, alternative assessment methods, such as portfolios, will need to be employed along with surveys and standardized tests. Ultimately, of course, the success of state academies will not be known until graduates assume their adult lives and their accomplishments and achievements are compared with those who held similar potential but opted for a traditional secondary education.

Conclusion

State-supported residential academies for academically gifted students are no longer just fledgling pilot programs. There now are nine such academies, and they are firmly established as viable options for extraordinary students who are seeking extraordinary opportunity and challenge. In the decade since the first academy opened, they have evolved from makeshift facilities in abandoned buildings to modern school campuses; and legislatures have continued to fund them with multi-million dollar budgets.

While the history of these state academies parallels the history of the most recent reform movement, their influence is likely to last far longer than the shrill reports of the current reform movement. Their missions speak to developing the wholeness of gifted students as well as to their responsibilities for outreach to the rest of the education community. Their curricula are academically rigorous, with accelerated courses of study as well as exploration and individual research. Their residential life programs provide wholesome activities and experiences for personal growth. They are very special places in the world of secondary education.

No one knows yet what benefits these state academies will have for individual gifted students, or what kind of changes they might bring about in traditional public schools. The academies themselves are only now realizing the need for sophisticated program evaluation. One incontrovertible conclusion is that nine states now have a distinctive alternative to the traditional programs of gifted education for secondary students.

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